

RETAIL DISPLAY SUPPORT HAVING REDUCED DRAG AND METHOD

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

[0001] This patent application is a continuation-in-part of copending U.S. Patent Application No. 10/390,444, filed March 17, 2003, pending.

FIELD OF THE INVENTION

[0002] This invention pertains to retail shelves, retail display hooks and other retail display supports that self face retail merchandise by facilitating forward movement of retail merchandise toward a front stop.

BACKGROUND OF THE INVENTION

[0003] In the field of retail display, display assemblies are typically mounted on a vertical support structure representing merchandise to the customer. The vertical structure is typically a pegboard, cross bars, slat wall support, or wire grid support. Display hooks attach to the vertical support typically by attachment of a back portion to the vertical structure. The use of display hooks in retail displays requires careful consideration of the effect the display has on consumers. For example, many display hooks are angled upward causing products on the hook to slide to the back of a product arm. When a product remains at a back of a product arm the product may not be seen by consumers, resulting in lower sales. Furthermore, consumers may assume that a store is not well stocked if product remains at the rear of a product arm of a display hook. The display can therefore appear empty and not presentable because of the configuration and design of a display hook.

[0004] The appearance of displays results in retailers spending man-hours to pull products to the front of a product arm. In the retail business, the action of pulling products forward is called "facing" a product. Display hooks that are "gravity fed" assist retailers in facing the product on display hooks by providing a downward angle so that products displayed on the hooks slide toward the front of the hook. However, gravity-fed display hooks typically require an angle sufficient to cause sliding of products. This angulation causes retailers to lose valuable retail space for displaying products. For example, angling a product arm downward 30-45 degrees for gravitational slide, can cause a retailer to lose nearly half a foot of display area as compared to non-gravity fed display hooks. As a result, gravity-fed hooks are unpopular with retailers.

[0005] Similar problems with display hooks are present with spring-loaded display hooks. In particular, spring-loaded display hooks require a product-specific spring such that spring tensions are not too strong or too light. Product-specific springs are expensive to produce and the likelihood of re-use is small due to the narrow range of product weights appropriate for each spring. Moreover, heavier products are incompatible with such spring-loaded systems due to the danger related to strong springs in a retail setting. Accordingly, there exists a need to provide a display assembly and more particularly, a display hook that overcomes these difficulties.

[0006] In a similar vein, retail shelves for retail merchandise attach to the vertical support typically by attachment of a cantilevered supported back portion to the vertical structure. The use of shelves and shelf pusher systems in retail displays also require careful consideration of the effect the display has on consumers, and safety issues pertaining to products to be displayed. Shelves can be angled to cause products to slide to the front of the shelf for easy viewing by consumers, but the angling must take into account shelf space required for such angling. When a product remains at a back of a product arm the product may not be seen by consumers, resulting in lower sales. Furthermore, consumers may assume that a store is not well stocked if product remains at the rear of a shelf. The display can therefore appear empty and not presentable because of the configuration and design of a shelf.

[0007] The appearance of displays results in retailers spending man-hours to pull products to the front of a product arm. In the retail business, the action of pulling products forward is called "facing" a product. Shelves that are "gravity fed" assist retailers in facing the product on shelves by providing a downward angle so that products displayed on the hooks naturally slide toward the front of the hook.

[0008] Commercially available gravity fed shelves include those under the brand names Darling, Madix, Street and Lozier. As is common among gravity fed shelves, the shelf material (often sheet metal), has a standard powder coated finish for retail shelves (finely ground particles of pigment, resin and other additives that are electrostatically charged and sprayed onto the shelf to be coated, which is grounded so that the charge particles electrically adhere to them until melted and fused into a solid coating in a curing oven).

[0009] However, gravity-fed shelves typically require an angle sufficient to cause sliding of products. In the above commercial brands of shelves, the standard inclined angle of the shelf is a vertical drop of 3.5 inches per 12 inches of horizontal depth. This inclination and relationship (vertical drop of 3.5 inches per 12 inches of horizontal depth) is believed applicable over different horizontal depth sizes for shelves, which have a typical horizontal depth range of between about 4 inches and about 30 inches in depth. This shelf

angle or inclination causes retailers to lose valuable retail space for displaying products. Since the display area is very valuable to retailers, gravity fed shelves have not been very popular in the marketplace, since retailers value the display space greater than the labor cost involved with manually facing the products.

[0010] Similar problems with shelves and additional problems are present with spring-loaded shelf pusher systems. These systems includes a spring biased pusher that urges retail merchandise toward a front stop. Shelf-pusher systems require a product-specific spring such that spring tensions are not too strong or too light. Unfortunately, not all merchandise products have similar weights or packaging. Product-specific springs are expensive to produce and the likelihood of re-use is small due to the narrow range of product weights appropriate for each spring. Moreover, heavier products are incompatible with such spring-loaded systems since the spring may not be strong enough to self face the product, and it is undesirable to use too strong of a spring in a retail setting. In a similar vein, light product accidentally held by a strong spring can result in products passing the front stop and falling off onto the floor.

[0011] Accordingly, there exists a need to provide a display assembly that overcomes these difficulties.

BRIEF SUMMARY OF THE INVENTION

[0012] The present invention is directed toward an apparatus for displaying retail merchandise that has a merchandise sliding surface with a reduced coefficient of friction relative to standard powder coating finishing techniques, that reduces the force needed to self face product. The apparatus includes a retail support structure, having a rearward portion that is adapted to be supported by the vertical support. The shelf support structure has a support surface extending horizontally, which is adapted to slidably support merchandise. The apparatus also comprises a front stop arranged proximate a front end of the support surface; and self facing means for facilitating forward movement of merchandise supported on the support surface toward the front stop. A reduced friction layer is provide on the support surface that has a static coefficient of friction that is less than a static coefficient of friction for a standard powder coated finish for retail shelves.

[0013] The retail support structure and associated mounting portion and support surface may be provided by a merchandise hook (often referred to as a "peg hook"), a shelf (which may be a flat panel or wire), the merchandise support structure of a spring loaded pusher system and/or other appropriate retail support structure. The self facing means may be provided by any currently known self facing device, including an inclined angle or

orientation to facilitate gravitational feeding, a spring (coil spring, flat spring, wind up spring, resilient member or other such spring) that biases merchandise toward the front stop, and/or any other self facing device that may be used in the retail merchandise industry.

[0014] The reduced friction layer is preferably provided by a flouopolymer such as such as polytetrafluoroethylene (ptfe) that may be sold under the brand name Teflon®. A flouopolymer has a static coefficient of friction that is less than the static coefficient of friction for a standard powder coated finish on retail shelves. The reduced friction layer may alternatively be provided by another appropriate coating, overlay, or finish such as a silicon ultraviolet (UV) type coating or other suitable coating for retail merchandise.

[0015] The present invention is also directed toward a method for displaying merchandise in a retail environment. The method comprises arranging a retail support structure having a support surface and a reduced friction layer on the support surface, the reduced friction layer having a static coefficient of friction that is less than a static coefficient of friction for a standard powder coated finish for retail shelves; loading retail merchandise onto to the reduced friction layer; and automatically self facing the retail merchandise over the reduced friction layer toward a front stop.

[0016] These and other aspects and advantages of the invention, as well as additional inventive features, will be apparent from the description of the invention provided herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] FIG. 1, labeled "prior art" illustrates a perspective view of a retail display hook and vertical support structure;

[0018] FIG. 2 illustrates a perspective view of a gravity-fed display hook constructed in accordance with the teachings an embodiment of the present invention;

[0019] FIG. 3 illustrates a perspective view of a spring loaded display hook constructed in accordance with the teachings of another embodiment of the present invention;

[0020] FIG. 4a illustrates an enlarged cross-sectional view, taken at line 2-2 in Figure 2; an enlarged front view, partially cut away, of the display assembly shown in Figure 2;

[0021] FIG. 4b illustrates another embodiment of the an enlarged cross-sectional view, taken at line 2-2 in Figure 2;

[0022] FIG. 5 illustrates a graph in accordance with an embodiment of the present invention;

[0023] FIG. 6 illustrates a flow diagram of a method in accordance with the teachings of the present invention.

[0024] FIG. 7 illustrates a perspective view of a retail merchandise display with a gravitationally feed shelf in accordance with another embodiment of the present invention.

[0025] FIG. 8 illustrates a perspective view of the retail merchandise display of FIG. 7, with merchandise loaded, dividers provided, and pricing labels provided thereon to illustrate operation of the invention.

[0026] FIG. 9 is a cross sectional illustration of the gravitationally feed shelf shown in FIG. 7.

[0027] FIG. 9a is an enlarged view of a portion of FIG. 9 taken about circle 9a of FIG. 9.

[0028] FIG. 10 is a perspective illustration of one form of a spring loaded pusher system, in accordance with another embodiment of the present invention.

[0029] FIG. 11 is a perspective illustration of another form of a spring loaded pusher system, in accordance with another embodiment of the present invention.

[0030] FIG. 12 is an embodiment of a removable mat having a reduced friction layer for placement on a shelf surface.

[0031] FIG. 13 is an embodiment of a gravitational feed wedge with a reduced friction layer for placement of a flat retail shelf.

DETAILED DESCRIPTION OF THE INVENTION

[0032] The following description references the drawings in which like elements in different drawings are identically numbered. The drawings depict selected embodiments and are not intended to limit the scope of the invention.

[0033] Turning now to the figures, Figure 1, labeled "prior art", depicts a view of a retail display hook 100, which is typically used for retail displays. The display hook is structured for attachment to vertical support 10. Vertical support 10 has been depicted as a board with a plurality of vertically-spaced apertures, which are used to mount retail display hooks, such as display hook 100. Other vertical supports appropriate for display hooks according to embodiments herein include slat wall supports, cross bar supports and wire grids. Vertical supports can be constructed of, for example, wire, stamped steel, wood or plastic. Display hook 100 generally includes a back member 110 for detachably connecting the display hook 100 to the vertical support 10. Display hook 100 further includes a product arm member 120, which can be constructed to hold retail products, for example. The product arm member 120 can be injection molded of plastic, can be steel-formed wire, or can be stamped steel separately or as part of a one-piece display hook. The length of product arm member 120 can vary from one inch to up to twenty inches or more. An

optional portion of a standard display hook includes scanning arm member 130. Scanning arm member 130 typically is constructed as a portion of the display hook that holds a label holder (not shown) in front of products displayed on product arm member 120. Product arm member 120 includes a storage portion 122 and a front stop in the form of retainer portion 150. The front stop or retainer portion 150 is disposed at an end of the product arm member 120 and includes an upwardly formed bend 160 that forms an angle for keeping products from falling off of the product arm member 120.

[0034] Bend 160 is generally upwardly to prevent products from falling off. Bend 160 is deflected from 0 degrees by an amount that depends on several factors. First, the type of retainer 150 makes a difference to bend 160. For example, some display hooks can have a retainer 150 angled up very slightly such that bend 160 must be upward from 0 degrees by 7-15 degrees to prevent products from falling off the product arm member 120. A second factor for bend 160 of the product arm member 120 is the weight of the product to be held on the display hook 100. For very heavy products, a product arm member 120 will bend downwardly, thus possibly requiring an increased upwardly bend 160.

[0035] Referring now to Figure 2, gravity-fed display hook 200 is shown. A gravity-fed display hook such as display hook 200 assists retailers by providing automatic facing (self-facing) of products. Display hook 200 includes a product arm member 220, which includes storage portion 222 and is integrally formed or connected with retainer member 250 and to a back bracket 210. Retainer member 250 includes an upwardly angled bend 260 interposed between the storage portion 222 and retainer member 250 of the product arm member 220. Gravity-fed hook 200 further includes scanning arm 230 with a first end for a label holder 240 and a label. Gravity-fed display hook 200 is gravity fed in that the product arm member 220 is deflected from 0 degrees downwardly such that a product displayed on the product arm member 220 will slide toward the front tip of the product arm 250. Gravity assists the product to self-face thereby avoiding retailers from having employees pull product to the front of the display arm. The greater the downward angle on the product arm member, the more likely gravity will affect product on the hook.

[0036] Typically, gravity-fed display hooks such as display hook 200 will have a retainer member 250 that forms a bend for retaining products thereon that forms an angle relative to the storage portion 222 of product arm member 220 that is appropriate for retaining the type of product suspended from the display hook. The angle can be an acute angle as shown, to a 90-degree angle to assure that product will not fall off product arm member 220 when the product slides forward on the hook and when a consumer removes a front product.

[0037] Also shown in Figure 2, is deflection angle 270, which is a downward angle for allowing gravity to cause products displayed on the product arm member to slide forward. A typical downward angle of a gravity-fed display hook is approximately 30-45 degrees, which causes retailers to lose approximately four inches of display area. For this reason, gravity-fed display hooks are unpopular. However, a reduced angle of less than 30 degrees is possible due to the use of a reduce friction layer or lubricious surface on the product arm member 220, as further explained below. As one of skill in the art with the benefit of this disclosure will appreciate, a reduced angle 270 is a function of the weight of the product to be displayed.

[0038] Referring now to Figure 3 a spring-loaded display hook is shown that illustrates an alternate embodiment. The spring-loaded hook includes a back 310 coupled to a product arm member 320. Back 310 is also coupled to scanning arm member 330 which at a first end thereof includes a label holder member 340. The product arm member 320 includes a storage portion 322 and a retainer member 350 integrally connected with storage portion 322. Retainer member has an upwardly angled bend 360 for retaining products on product arm member 320. Back 310 is shown attached to vertical support 370. Spring-loaded hook 300 is a spring-type display hook that pushes or pulls products on the display along product arm member 320 toward the front stop. As one of skill in the art will appreciate, there are several variations of spring-loaded hooks using spring tension for pushing or pulling a product toward the front stop of a product arm member 320. Typically in each spring-loaded display hook angle 360 at the front of the product arm member 320 is kept at an approximate 90-degree angle to keep products from being pushed or pulled off of the product arm member 320, and/or to maximize display area. The spring-loaded hook 300 further includes a product pushing apparatus 382, which includes a plastic or metallic product pusher 383, which is coupled to spring 380. Spring 380 couples the plastic or metal product pusher 383 to pusher support member 384. Pusher support member 384 couples spring 380 to the end of the label holder member 340 and is also coupled to label device 342.

[0039] Figures 4a and 4b illustrate embodiments of the present invention directed to a display hook having a reduced friction layer in the form of a lubricious surface on product arm member 220 or 320 at cross sections 4a-4a of product arm 220 and 320 of Figure 2 and Figure 3. The coating 410 shown in Figure 4a surrounds product arm member 220 and 320. The coating 412 shown in Figure 4B partially surround product arm member 220 and 320. The coating 410 is a circumferential coating, and coating 412 is a partially circumferential coating of product arm member 220 and 320 deposited at least along the exterior perimeter portion of the display arm member 220 and 320, the coating material to create the lubricious coating may include a fluoropolymer such as polytetrafluoroethylene (ptfe), or silicone. The

coating can be electrostatically applied via a liquid or powder form. A silicone coating with ultraviolet curing can also create the lubricious coating or other similar form of reduced friction layer. Other types of coating are also possible that would be within the scope of the present invention. For example, instead of a coating, the reduced friction layer and lubricious surface can be via a fluoropolymer tape such as a ptfe tape.

[0040] In one embodiment, the display hook 200 may have special plating to enhance adhesion of the coating to the display hook. For example, adhesive binding could assist the adhesive qualities of a bonding for a coating. The lubricious coating on display hook 200 advantageously results in the angle of deflection for product arm member 220 being less than otherwise would be required for self-facing of product on the product arm member 220.

[0041] According to embodiments herein, the coating and the silicone coating provide a near-zero coefficient of friction for products placed on display hook 200 and 300. The coefficient of friction on product arm member 220 and 320 is a factor that includes variables such as product weight, the number of products on the product arm and the design of the self-facing configuration.

[0042] The importance of the coefficient of friction to the effective product weight of products displayed on a display hook is an important consideration as shown by an exemplary product weight calculation shown in Table 1, below:

Table 1

Product weight	2 ounces
Number of products on product arm	10 pieces
Total weight to push or slide	20 ounces
Multiply by coefficient of friction (static)	.3
Total force to move in ounces	6 ounces (20 X 0.3 = 6)
TOTAL WEIGHT TO PUSH OR SLIDE	26 ounces

[0043] As shown in Table 1, spring-loaded display hooks such as spring-loaded display hooks 300, and gravity-fed display hooks such as hook 200 are affected by the coefficient of friction of the hook. As shown, the static coefficient of friction effectively alters the weight of products to be pushed. By using a fluoropolymer such as ptfe coating or a silicone coating on the product arm member, a near zero drag coefficient can significantly reduce the amount of weight that needs to be pushed or gravity affected on display hooks 200 and 300.

[0044] By reducing the total weight that requires pushing or sliding, a retailer is significantly advantaged by providing a weaker spring for spring-loaded display hook system for display hooks. Strong springs in pushed systems are unsatisfactory or undesirable due to the strength of the spring creating a great variation of springs required for

different types of products. By providing a lower coefficient of friction, a weaker spring may be used over a much wider range of product weights, sizes and packaging resistance. Likewise, a greater angle on a gravity-fed display hook 200 requires excessive amounts of space for displaying products due to a large gravity feed angle that is required. By reducing the drag coefficient via a fluoropolymer coating or silicone coating, the spring strength of the spring-loaded display hook 200 can be narrowed and the angle required for gravity-fed display hooks can be reduced.

[0045] The angling for self-facing on a gravity-fed display hook such as gravity-fed display hook 200 required when using either a fluoropolymer such as ptfe or silicone on the product arm member can be less than 30 degrees. More particularly, referring to Table 2, below, in combination with Figure 5, a graph illustrates the required force in ounces required to cause self-facing of a one pound article on display hook 200 at different angles. As shown, a galvanized hook at a ten degree inclination requires about 11.4 ounces of force, and at a negative ten degree declination requires three ounces of force. In sharp contrast to the galvanized display hook, a fluoropolymer coated display hook requires less than half the force at a ten degree inclination to move the one pound article (about 4.8 oz. of force); and at a ten degree declination, no force is required to move the article (about 0 oz. of force). Comparing a powder coated display hook with the fluoropolymer coated display hook, the results show that less force is required to move a one pound article. For example, the display hook 200 can self-face a one pound article at a force of about 2.1 ounces when the retail display hook is level.

Table 2

	10°	0°	-5°	-10°
Galvanized	11.4	6.2	4.1	3
Powder Coated	8.6	3.5	2.1	0
Fluoropolymer Coated	4.8	2.1	0.5	0

[0046] The results shown in Table 2 are provided in graph format in Figure 5. Specifically, Figure 5 illustrates an x-axis 510 representing an angle of inclination, and a y-axis 520 representing an amount of force in ounces required to move a one pound article suspended on a display hook, such as display hook 200. Line 530 represents a fluoropolymer-coated hook, such as a Teflon™-coated display hook; line 540 represents a powder-coated display hook; and line 550 represents a galvanized-type display hook. As shown, the fluoropolymer-coated display hook requires less force to move a one-pound article than either the powder-coated hook or the galvanized hook.

[0047] Referring now to Figure 6, a method for manufacturing a display hook as described herein is provided. Block 610 provides for forming a hook including a product

arm member configured for disposing products thereon. Block 620 provides for treating at least a portion of the product arm member with a flouropolymer. The flouropolymer can be ptfe or another slick coating material as will be appreciated by those of skill in the art of coatings with the benefit of this disclosure. The coating provides a slick surface thereby providing a safer spring-loaded display hook assembly and by providing decreased shelf space for gravity-fed display hook assemblies.

[0048] Turning to FIGS. 7-9, a further embodiment of the present invention is illustrated in the form of a retail merchandise display. This embodiment takes the form of a retail shelf 710 that facilitates automatic gravitational front feeding of retail merchandise. The retail shelf 710 is typically formed of sheet metal material or alternatively wire material, or in some instances may be plastic. In the disclosed embodiment, the shelf 710 includes a top support panel 712 of sheet metal material and a pair of horizontal supports 714 that extend along opposed lateral sides of the panel 712 (only one side being shown to better illustrate the invention although it will be understood the opposing side is identical).

[0049] The rearward portion of the retail shelf includes mounting brackets 716 formed integrally with the horizontal supports 714. These mounting brackets 716 slide and releasably lock into the slots 720 of horizontally spaced vertical supports 718 and are selectively manually adjustable such that the vertical spacing of different shelves 710 can be selected and optimized for the desired retail environment. When mounted to the vertical supports 718, the top support panel 712 extends forwardly and angles downwardly as it extends forwardly to facilitate gravitational self facing of merchandise 712. A front stop shown in the form of a wire retainer 722 is provided proximate a front end of the shelf 710. The front stop retainer 722 is releasably mounted to the shelf 710 by integral mounting prongs 724 that project closely into mounting holes 726 formed proximate the front or forward end of the shelf 710, near the price channel 728 or "C-Channel" which is configured to hold price labels 730 having printed indicia thereon (e.g. price and bar code information) relating to the merchandise 711 held by the retail display unit.

[0050] The top support panel 712 includes a sliding surface 732 upon which merchandise slides forward under the force of gravity. Over the sliding surface 732 is a reduced friction layer 734, which may take many different forms. As shown in FIGS. 7-9, that layer 734 may be provided by an integral coating with the shelf which is done by coating a fluoropolymer such as PTFE, a silicone coating and/or other appropriate material that has a reduced coefficient of friction relative to standard pigment powder coating for retail shelving. Such coating of PTFE may be done via powder coating or via other conventional bonding or PTFE coating techniques.

[0051] It should be noted that, the reduced friction layer 734 need only be provided over the sliding surface 734 and may include cold additives. The remaining surface area 736 (including the price channel 728, horizontal supports 714 and other portions of the top support panel 712), which may be viewed by retail customers, may be painted or pigment powder coated finished to provide aesthetics in the retail environment. Alternatively, the entire retail shelf 710 may be coated with PTFE or other reduced friction layer.

[0052] There are other ways to provide the reduced friction layer 734, including as shown in FIG. 12, a sheet overlay in the form of a mat 738 that is placed over the top support panel 712. The mat 738 may or may not include a support layer 740 for the reduced friction layer 734 and may or may not include a tacky or skid resistant surface 742 such as may be provided by a high coefficient of friction material or an adhesive (preferably a removable adhesive) such that when the mat 738 is placed on the inclined angled top panel 712, the mat 738 stays put and does not migrate. Preferably a removable adhesive 742 is used to releasably secure the mat 738 to the shelf top to allow for replacement after extended intervals. A release line 741 may be temporarily placed over the removable adhesive 742 until such time as the mat is employed on a shelf.

[0053] Referring to FIG. 13, a further alternative is that the reduced friction layer 734 may be provided on a wedge 744 that is placed and may be mounted onto a horizontally planar shelf (rather than an inclined shelf as shown in FIGS. 7-9). The angle of the wedge 744 can be selected according to the different retail merchandise products with a steeper angle provided for more slide resistant products and a smaller angle for less slide resistant products.

[0054] Turning again to FIGS. 7-9, the angle of the inclined top support panel 712 and reduced friction layer 734 relative to true horizontal H may be less than the standard shelves, namely, a vertical drop of less than the standard of 3.5 inches per 12 inches of horizontal depth, over a typical horizontal depth range of between about 4 inches and about 30 inches in horizontal depth. By using a flouropolymer such as PTFE, the vertical drop may be less than 3.0 inches per 12 inches in horizontal depth, more preferably less than about 2.5 or even less than 2.0 inches of vertical drop per 12 inches of horizontal depth. Preferably, to better ensure that merchandise products naturally self face, flat panel shelves should have a vertical drop of greater than about 1.5 inches per 12 inches in horizontal depth for a flouropolymer such as PTFE.

[0055] The invention has been found to be particularly advantageous for flat panel shelves, although improvements in a reduced coefficient static friction is also achieved by using the reduced friction layer 734 on wire frame shelves.

[0056] A significant advantage of the present invention is that a reduced shelf angle or inclination may be achieved relative to gravitational feed shelves without the reduced friction layer 734 (e.g. standard pigment powder coat finished shelves), which frees up additional valuable retail space for displaying products for retailers. More shelves 710 can be placed over the vertical supports 718 providing for the display of additional retail merchandise. Since the display area is very valuable to retailers, gravity fed shelves with a reduced friction layer 734 and thereby a reduced angle, provide the ability for retailers to avoid the labor cost involved with manually facing the products, without sacrificing substantial display area. Thus, it is anticipated that with the present invention, that gravity feed shelves will be much more attractive and practical for retailers.

[0057] Retailers will use the shelves by loading retail merchandise 711 (e.g. products contained in boxes, packages, etc.) onto to the sliding surface 732 and reduced friction layer 734, with successive products stacked horizontally behind one another up the ramped surface. The merchandise 711 will naturally slide forward under the force of gravity toward the front stop which is shown in the form of a wire retainer 722. Pricing information contained on a price label 730 is placed into the price channel 728 or other label holder in a location corresponding to the position of the merchandise (e.g. vertically aligned). As the foremost merchandise 711 is removed by customers for purchase, the remaining stacked merchandise automatically self faces by sliding over the reduced friction layer until contact the front stop/wire retainer 722.

[0058] Referring to further embodiments of FIGS. 10 and 11, the shelf may take the form of a spring loaded shelf pusher system, that may be horizontally planar when mounted or at a slight angle. It will be understood that these embodiments operate similar to the embodiments above, except that a spring and pusher is used to push and/or assist forward movement of retail merchandise toward the front stop, as such additional details for these embodiments will be limited to the spring pusher assembly and advantages thereof, to avoid duplicative disclosure.

[0059] FIG. 10, illustrates a spring loaded shelf pusher system 800 with a shelf 812 have a reduced friction layer 814 over the shelf support sliding surface 816 that slidably supports retail merchandise. A pusher plate 818 includes a slide retainer 820 that rides in a horizontal or linear track 821 toward and away from a front stop, which in this case is a transparent front wall 824 mounted at the front of the shelf 812. A spring 826 biases the pusher plate 818 toward the front stop/ wall 824. In operation product between the pusher plate 818 and the front stop/wall 824 will be spring biased toward the front stop/wall 824 and thereby caused to automatically self face as product is removed, keeping product abutted up against the front wall.

[0060] FIG. 11 is similar to FIG. 10, except that the shelf is not flat panel but a wire frame 912, with the reduced friction layer 914 over the support shelf wires 916 that provide the shelf support surface. This embodiment also shows a slightly different form of spring 926 in the form of a recoil spring that biases the pusher 918 toward the front stop 924. Regular coil springs or other resilient devices including other resilient materials may be used as the spring.

[0061] The advantages of the embodiments of FIGS. 10 and 11 are that a weaker spring can be used over a wider range of weights and packaging types. The weaker spring will still self face heavy and more resistant type packaging, while at the same time preventing use of heavy springs which may cause product to shoot off the shelf past the front stop and onto the retail store floor. As a result, the reduced friction layer improves the practicality and reliability of spring loaded shelf pusher systems.

[0062] All references, including publications, patent applications, and patents, cited herein are hereby incorporated by reference to the same extent as if each reference were individually and specifically indicated to be incorporated by reference and were set forth in its entirety herein.

[0063] The use of the terms “a” and “an” and “the” and similar referents in the context of describing the invention (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. The terms “comprising,” “having,” “including,” and “containing” are to be construed as open-ended terms (i.e., meaning “including, but not limited to,”) unless otherwise noted. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., “such as”) provided herein, is intended merely to better illuminate the invention and does not pose a limitation on the scope of the invention unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the invention.

[0064] Preferred embodiments of this invention are described herein, including the best mode known to the inventors for carrying out the invention. Variations of those preferred embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description. The inventors expect skilled artisans to employ such variations as appropriate, and the inventors intend for the invention to be practiced otherwise than as

specifically described herein. Accordingly, this invention includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the invention unless otherwise indicated herein or otherwise clearly contradicted by context.